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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/619,371	07/19/2000	Patrick J. Treado	000537	2198

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EXAMINER	
AMARI, ALESSANDRO V	

ART UNIT	PAPER NUMBER
2872	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/619,371	Applicant(s) TREADO ET AL.	
	Examiner Alessandro V. Amari	Art Unit 2872	

-- Th MAILING DATE of this communication app ars on the cov r sh et with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-8,18,20-23,25,28-35,45,47 and 48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4-8,18,20-23,25,28,30-35,45,47 and 48* is/are rejected.

7)☒ Claim(s) *3 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 45 and 47 are objected to because of the following informalities:

Regarding claim 45, line 8, the phrase "said liquid crystal tunable filer" lacks antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2-6, 7, 8, 28-32, 33, 34, 35 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feld et al PCT WO95/11624 in view of Wach et al U.S. Patent 6,222,970 and further in view of Ono et al US Patent 5,394,499.

In regard to claims 2, 28 and 48, Feld et al teaches (see Figure 1, 2-4) a Raman imaging fiberscope for the collection of white light images, Raman chemical images and Raman spectra from a sample comprising: an outerjacket as shown in Figures 2, 3 and 4 and as described on page 37, lines 8-10; one or more white light illumination fibers, disposed in said outerjacket, for transmitting white light from a white light source to said sample as described on page 39, lines 19-22 and as shown in Figure 1, 2-4, one or more laser illumination fibers (52), disposed in said outer jacket, for transmitting laser light of a specific laser excitation wavelength from a laser source to said sample; a coherent fiber bundle (54), disposed in said outer jacket, for transmitting a white light

image of said sample and a Raman chemical image of said sample based on light scattered, reflected or emitted from said sample from one end of said fiber bundle proximate said sample to the opposite end of said fiber bundle distal said sample wherein said white light images, said Raman chemical images and said Raman spectra are all collected through said coherent fiber bundle as described on page 5, lines 20-34, page 6, lines 1-21 and page 37, lines 3-11. Regarding claims 4 and 30, Feld et al teaches (see Figure 2) one or more lenses (220, 240) positioned between said sample and said coherent fiber bundle. Regarding claim 31, Feld et al teaches (see Figure 2) an outer jacket for enclosing said fiberscope, said outer jacket containing said white illumination fibers, said laser illumination fibers and said coherent fiber bundle as described on page 13, lines 17-29 and page 37, lines 8-10 and as shown in Figure 1. Regarding claims 6 and 32, Feld et al teaches (see Figure 2) an optically transparent window (280) disposed at the end of said outer jacket proximate said sample.

However, Feld et al does not teach a laser bandpass filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of said specific laser excitation wavelength and rejecting light of other wavelengths, a laser rejection filter positioned between said sample and said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength.

In regard to claims 2, 28 and 48, Wach et al does teach a laser bandpass filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of said specific laser excitation wavelength and rejecting light of other wavelengths, a laser rejection filter positioned between said sample and

said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength as described in column 53, lines 15-24 and a spatial filter positioned between sample and coherent fiber bundle as described in column 34, lines 58-61 and column 64, lines 25-32. Regarding claims 3 and 29, Wach et al teaches that said laser bandpass and said laser rejection filters exhibit environmental insensitivity to temperature and humidity as described in column 62, lines 53-67 and column 64, lines 64-67 and column 65, lines 1-23. Regarding claims 5 and 35, Wach et al teaches that said laser rejection and bandpass filters are metal oxide dielectric filters as described in column 80, line 30. Regarding claims 8 and 34, Wach et al teaches that the bandpass filter is spatially patterned into a first portion for filtering said laser light and a second, transparent portion for transmitting light scattered or reflected by said sample to said coherent fiber bundle as described in column 53, lines 9-22.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the filters of Wach et al in the fiberscope of Feld et al in order to block any unwanted light scattered from the sample.

Regarding claims 7 and 33, Feld et al teaches the invention as set forth above but does not teach that the window is composed of a material selected from a group comprising quartz, diamond and sapphire.

Regarding claims 7 and 33, Wach et al does teach that the window is composed of a material selected from a group comprising quartz, diamond and sapphire as described in column 30, lines 15-18.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the material as taught by Wach et al in the window of Feld et al in order to provide a protection and transparency for the fiberscope elements.

Furthermore, in regard to claims 2, 28 and 48, Feld et al in view of Wach et al teaches the invention as set forth above but does not teach a spatial filter positioned between said sample and said coherent fiber bundle for restricting the field of view of said coherent fiber bundle.

In regard to claims 2, 28 and 48, Ono et al does teach (see Figure 9) a spatial filter (36) positioned between said sample and said coherent fiber bundle as described in column 5, lines 48-52.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the spatial filter as taught by Ono et al in the combination of Feld et al and Wach et al in order to limit the size of the object that can be imaged and to improve the image quality.

4. Claims 18, 20, 21, 45 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feld et al PCT WO95/11624 in view of Wach et al U.S. Patent 6,222,970 further in view of Ono et al US Patent 5,394,499 and further in view of "Liquid Crystal Tunable filter Raman Chemical Imaging" Treado et al.

In regard to claims 18, Feld et al, Wach et al and Ono et al teach the invention as set forth above and regarding claims 20, 21 and 45, Feld et al teaches (see Figure 1) a mount for holding said fiberscope in proximity to said sample, a link for directing the output of said fiberscope under white light illumination conditions to a video CCD (100)

for viewing on a video monitor (120), a link for directing the output of said fiberscope under laser illumination conditions to a Raman spectrometer (140) and a CCD camera (140) coupled to output of spectrometer but does not teach that the output of said fiberscope is linked to said liquid crystal tunable filter imaging spectrometer. Regarding claim 47, Feld et al teaches (see Figure 1) software and hardware (150) for producing and displaying a Raman chemical image of said sample.

However, in regard to claim 18, the combination of Feld et al, Wach et al and Ono et al does not teach a liquid crystal tunable filter imaging spectrometer.

In regard to claim 18, Treado et al does teach a liquid crystal tunable filter imaging spectrometer as described in the abstract.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the liquid crystal tunable filter as taught by Treado et al in the fiberscope of Feld et al in view of Wach et al and further in view of Ono et al in order to provide for high spatial and spectral resolution for high definition Raman chemical imaging.

5. Claims 22, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feld et al PCT WO95/11624 in view of Wach et al U.S. Patent 6,222,970 further in view of Ono et al US Patent 5,394,499 and further in view of "Liquid Crystal Tunable filter Raman Chemical Imaging" Treado et al.

In regard to claim 22, Feld et al teaches (see Figure 1, 2-4) a Raman imaging fiberscope for the collection of white light images, Raman chemical images and Raman spectra from a sample comprising: an outer jacket as shown in Figures 2, 3 and 4 and

as described on page 37, lines 8-10; one or more white light illumination fibers, disposed in said outerjacket, for transmitting white light from a white light source to said sample as described on page 39, lines 19-22 and as shown in Figure 1, 2-4, one or more laser illumination fibers (52), disposed in said outer jacket, for transmitting laser light of a specific laser excitation wavelength from a laser source to said sample; a coherent fiber bundle (54), disposed in said outer jacket, for transmitting a white light image of said sample and a Raman chemical image of said sample based on light scattered, reflected or emitted from said sample from one end of said fiber bundle proximate said sample to the opposite end of said fiber bundle distal said sample wherein said white light images, said Raman chemical images and said Raman spectra are all collected through said coherent fiber bundle as described on page 5, lines 20-34, page 6, lines 1-21 and page 37, lines 3-11. Regarding claim 23, Feld et al teaches (see Figure 1) a mount for holding said fiberscope in proximity to said sample, a link for directing the output of said fiberscope under white light illumination conditions to a video CCD (100) for viewing on a video monitor (120), a link for directing the output of said fiberscope under laser illumination conditions to a Raman spectrometer (140) and a CCD camera (140) coupled to output of spectrometer. Regarding claim 25, Feld et al teaches (see Figure 1) software and hardware (150) for producing and displaying a Raman chemical image of said sample.

However, in regard to claim 22, Feld et al does not teach a laser bandpass filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of said specific laser excitation wavelength and rejecting

light of other wavelengths, a laser rejection filter positioned between said sample and said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength.

In regard to claim 22, Wach et al does teach a laser bandpass filter positioned between said one or more laser illumination fibers and said sample for transmitting said laser light of said specific laser excitation wavelength and rejecting light of other wavelengths, a laser rejection filter positioned between said sample and said coherent fiber bundle for transmitting wavelengths of light other than said specific laser excitation wavelength as described in column 53, lines 15-24 and a spatial filter positioned between sample and coherent fiber bundle as described in column 34, lines 58-61 and column 64, lines 25-32.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the filters of Wach et al in the fiberscope of Feld et al in order to block any unwanted light scattered from the sample.

Furthermore, in regard to claim 22, Feld et al in view of Wach et al teaches the invention as set forth above but does not teach a spatial filter positioned between said sample and said coherent fiber bundle for restricting the field of view of said coherent fiber bundle.

In regard to claim 22, Ono et al does teach (see Figure 9) a spatial filter (36) positioned between said sample and said coherent fiber bundle as described in column 5, lines 48-52.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the spatial filter as taught by Ono et al in the combination of Feld et al and Wach et al in order to limit the size of the object that can be imaged and to improve the image quality.

Furthermore, in regard to claim 22, Feld et al in view of Wach et al and further in view of Ono et al teach the invention as set forth above but do not teach a liquid crystal imaging spectrometer.

In regard to claim 22, Treado et al does teach a liquid crystal tunable filter imaging spectrometer as described in the abstract.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the liquid crystal tunable filter as taught by Treado et al in the fiberscope of Feld et al in view of Wach et al and further in view of Ono et al in order to provide for high spatial and spectral resolution for high definition Raman chemical imaging.

Allowable Subject Matter

6. Claims 3 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 3 and 29 are allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, "a temperature dependent bandshift coefficient of about .005 nm per degree centigrade or less" as set forth in the claimed combination.

The prior art of record, Feld et al, Wach et al, Treado et al and Ono et al teach a Raman imaging fiberscope for collection of white light images, Raman chemical images and Raman spectra comprising an outer jacket, white light illumination fibers, one or more laser illumination fibers, a coherent fiber bundle, a laser bandpass filter positioned between one or more laser illumination fibers and sample, a laser rejection filter positioned between said sample and coherent fiber bundle wherein said white light images, said Raman chemical images and said Raman spectra are all collected through said coherent fiber bundle and a spatial filter positioned between said sample and said coherent fiber bundle. However, the prior art does not teach that the laser bandpass and laser rejection filters exhibit a temperature dependent bandshift coefficient of about .005 nm per degree centigrade or less and there is no teaching or motivation to modify this difference as derived.

Response to Arguments

8. Applicant's arguments with respect to claims 2, 22, 28 and 48 have been considered but are moot in view of the new ground(s) of rejection.

With respect to claims 8 and 34, the applicant argues that Wach et al does not teach a laser bandpass filter which is a spatially patterned filter having a filtering portion and a transparent portion and indicates that he can find no reference to such a filter in the cited sections of Wach et al.

In response to this argument, the Examiner directs the applicants attention to column 53, lines 9-22 and specifically, lines 9-10, which recite:

"For Stokes-shift Raman analysis, the delivery fiber should be filtered with a low pass or band pass filter"

Further along in column 53, lines 15-16, Wach et al recites,

"The collection fibers 6380 should also be filtered; although, this is often **not a requirement**." (emphasis Examiner's)

Thus, Wach teaches a spatially patterned filter having a filtering portion (i.e., the low-pass or band pass filter" and a transparent portion and a second transparent portion (i.e., since there is no requirement that the collection fibers be filtered, this portion of the filter would be transparent and thus meet the claimed limitation).

With respect to claims 6, 7, 33 and 34, the applicant argues that Wach et al teaches away from the claimed limitation of a window.

In response to this argument, the Examiner would direct the applicant attention to multiple citations of a window in Wach et al, namely column 11, lines 36-37 and lines 57-59, column 12, lines 6-9, column 30, lines 15-18, column 39, lines 28-30 and lines 39-41 and column 40, lines 1-2. While the citation of column 30, lines 6-9, seems to teach away from the use of a window, this is highly dependent on the application. For example, in column 30, lines 15-18, Wach et al states the following:

"Certain **windows** and coatings such as those in the diamond family exhibit strong Raman signatures. These signatures can be used to significant analytical advantage in certain application environments" (emphasis Examiner's)

Therefore, Wach et al does meet the claimed limitation of a window.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MARK A. ROBINSON
PRIMARY EXAMINER

ava
07 October 2003